

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 695427	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU2003/000674	International Filing Date (day/month/year) 30 May 2003	Priority Date (day/month/year) 3 June 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ B23K 9/095, 9/173		
Applicant UNIVERSITY OF WOLLONGONG et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheet(s).

3. This report contains indications relating to the following items:

I	<input checked="" type="checkbox"/>	Basis of the report
II	<input type="checkbox"/>	Priority
III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	<input type="checkbox"/>	Lack of unity of invention
V	<input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	<input type="checkbox"/>	Certain documents cited
VII	<input type="checkbox"/>	Certain defects in the international application
VIII	<input checked="" type="checkbox"/>	Certain observations on the international application

Date of submission of the demand 30 December 2003	Date of completion of the report 13 September 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer RAJEEV DESHMUKH Telephone No. (02) 6283 2145

I. Basis of the report**1. With regard to the elements of the international application:***

- ☒ the international application as originally filed.
- ☐ the description, pages , as originally filed,
 pages , filed with the demand,
 pages , received on with the letter of
- ☐ the claims, pages , as originally filed,
 pages , as amended (together with any statement) under Article 19,
 pages , filed with the demand,
 pages , received on with the letter of
- ☐ the drawings, pages , as originally filed,
 pages , filed with the demand,
 pages , received on with the letter of
- ☐ the sequence listing part of the description:
 pages , as originally filed
 pages , filed with the demand
 pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 6, 7, 12 - 14, 19, 20, 25 - 29	YES
	Claims 1 - 5, 8 - 11, 15 - 18, 21 - 24	NO
Inventive step (IS)	Claims 13, 14, 26 - 29	YES
	Claims 1 - 12, 15 - 25	NO
Industrial applicability (IA)	Claims 1 - 29	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered as relevant for the purposes of this report:

D1: US 6 313 437	D5: SU 1743752
D2: JP 11-226734	D6: JP 60-108176
D3: JP 11-267839	D7: JP 56-009062
D4: DE 4204661	

Novelty (N) (claims 1 - 5, 8 - 11, 15 - 18, 21 - 24)

Claims 1 - 5, 11, 15 - 18, 24: The online machine translation of D2 (see <http://www4.ipdl.jpo.go.jp/Tokujitu/PAJdetail.ipdl?N0000=60&N0120=01&N2001=2&N3001=H11-226734>) discloses a method of arc welding in which the current to a consumable electrode (and hence its melt rate, as is well known in the art) and the wire feed speed are controlled by a pulse control signal. This pulse control signal varies periodically to control predetermined events programmed to occur during the welding process - that is to enlarge or contract a molten metal pool (see for example paragraphs [0008] - [0009] & [0012]). A feedback mechanism based on the feed speed of the electrode is used to stabilize the arc. Claims 1 - 5, 11, 15 - 18 & 24 are therefore not novel in light of D2.

Claims 15, 21, 22, 24: The online machine translation of D3 (see <http://www4.ipdl.jpo.go.jp/Tokujitu/PAJdetail.ipdl?N0000=60&N0120=01&N2001=2&N3001=H11-267839>) discloses an arc welding method in which an electrode is fed at high speed during periods when the welding torch is periodically stopped and fed at low speed during periods when the welding torch is advancing. The rate of advancement of the electrode is therefore controlled in response to predetermined events in the welding process (see for example paragraph [0005]). Claims 15, 21, 22 & 24 are therefore not novel in light of D3.

Claims 1, 2, 15 - 17: D4 discloses an arc welding method in which the wire feed is reversed at the end of the weld (a predetermined event), and the welding current (which determines the melt rate) is adjusted to a maximum value at the start of the reversal of the wire feed. Claims 1, 2 & 15 - 17 are therefore not novel in light of D4.

Claims 1, 2, 15: D5 discloses an arc welding device in which the direction of wire feed is reversed after a predetermined period, and after striking an arc, the welding current is increased smoothly until the welding is finished. Claims 1, 2 & 15 are therefore not novel in light of D5.

(continued on supplemental sheet)

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- (1) Claims 1 & 15 are not clear with respect to the predetermined events that result in the control of the rate of advancement and/or the melt rate. In particular it is not clear whether these predetermined events are events that occur during the whole welding process (as claimed), or are events that occur within each periodic cycle within the welding process (as the description appears to suggest).
- (2) Claim 15 is not fully supported by the description because it defines regulation of the rate of advancement of an electrode only, and fails to include any regulation of the instantaneous electrode melt rate. The discussion at page 1 line 10 - page 3 line 6 of the description clearly indicates that control over both the rate of advancement *and* the instantaneous melt rate are essential aspects of the invention. Furthermore, the summary of the invention at page 3 lines 9 - 33 clearly states that both the rate of advancement *and* the instantaneous melt rate are regulated in the method of the invention. Finally, at page 5 lines 16 - 21, it is clearly stated that the objects of the invention are achieved by regulating both the rate of advancement *and* the instantaneous melt rate

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of V

Claims 1 - 3, 8 - 11, 15 - 17, 21 - 24: D6 discloses a arc starting method in which a consumable electrode that is advanced to contact a base material is stopped for a prescribed time during which a small current preheats the wire electrode (regulation of the melt rate). The moment of contact between the electrode and the base material is detected by a detecting device. The next welding cycle then starts again after a set time has elapsed. Claims 1 - 3, 8 - 11, 15 - 17 & 21 - 24 are therefore not novel in light of D6.

Claims 15 - 17, 21 - 24: D7 discloses a method of arc welding in which a consumable electrode is withdrawn when a short circuit (predetermined event) is detected between the electrode and the base material. Therefore claims 15 - 17 & 21 - 24 are not novel in light of D7.

D1 discloses a method for arc welding that employs a consumable electrode in which the welding operation is terminated by fading the arc voltage and the wire feed rate. The arc voltage and wire feed rate are decreased in small steps (dynamically) in response to the predetermined *end of the welding process*. However, D1 does not disclose varying the arc voltage and wire feed rates during each cycle of a welding operation, and hence Claims 1 - 29 are novel in light of this document.

The features of the remaining claims (6, 7, 12 - 14, 19, 20, 25 - 29) are not disclosed in any of these prior art documents.

Inventive Step (IS) (claims 1 - 12, 15 - 25)

Claims 1 - 5, 8 - 11, 15 - 18 & 21 - 24 also lack an inventive step for the reasons given above. Furthermore, the features added by claims 6, 7, 12, 19, 20 & 25 relate only to features that are common in the art of arc welding (eg feedback by measuring voltage or current, or the use of specific gases as a shielding gas) and hence do not contribute to any inventive step.

The features of the remaining claims (12, 14, 26 - 29) are not disclosed or suggested by any of the prior art documents, either individually or in an obvious combination. In particular, the specific application to a welding system operating in a dip transfer mode appears to be inventive over the identified prior art.